cancer registries that had collected cancer incidence data for calendar year 1988.[19,20] Eleven hospitals responded with data on 1,080 cases. These data were edited and entered into the computerized database of the NC-CCR. Survival patterns for four years were examined.

Survival analyses were performed using the SAS software programs PHREG and LIFETEST.[21] Non-resident cases were excluded from analysis, leaving 1,003 cases available for analysis. Subgroup survival analyses were performed by race groups (black versus white), urban/rural status (U.S. Census definitions or the presence of a state-of-the-art medical facility), age of patient, and stage at diagnosis. Also, comparisons of North Carolina prostate cancer survival were made to national prostate cancer survival patterns.[22,23]

Statistics for comparing the observed versus expected numbers of cases (chi-square) were used for interpreting the results throughout this study. The chi-square statistic can be quite sensitive for analyses involving large numbers of cases. This means that even small percentage differences between the observed and expected numbers can result in quite large values of chi-square. Owing to the large sample sizes of the national databases, the observed/expected calculations were always made with the North Carolina data in an attempt to lessen the possibility of artificial sensitivity to relatively small differences.

Finally, a comparison was made between the average charges for hospitalization between blacks and whites. The NC-CCR 1991 database was linked to the 1991 hospital discharge data from the North Carolina Medical Database Commission.

**RESULTS**

In the course of the survival analyses, it quickly became apparent that North Carolina prostate cancer data were different than the national databases

that had been selected for comparison.[22,23] This finding led to a series of separate analyses to evaluate these differences. In this section, the survival outcomes are presented first, since they were the defining motivation for the study.

### North Carolina Survival Patterns

Table 1 shows the chi-square statistics for each of the four variables being studied for their effect on survival. The statistical significance for each of these factors as single predictors of poorer survival is presented as well. The variation in survival for each of these single effects is presented in Figures 1-4. The risk ratios, for poorer survival, for each factor are shown in Table 1.

**Table 1**
**Single Effects on Four-Year Relative Prostate Cancer Survival, North Carolina, 1988-92 (Risk Associated with Poorer Survival)**

| Variable | Chi-Square | p value < Chi-Square | Risk Ratio* |
|---|---|---|---|
| Age | 2.02 | 0.155 | |
| < 65 | | | 1.00 |
| ≥ 65 | | | 1.20 |
| Race | 5.77 | 0.016 | |
| White | | | 1.00 |
| Black | | | 1.23 |
| Stage | 92.09 | 0.0001 | |
| Local | | | 1.00 |
| Regional | | | 1.06 |
| Distant | | | 2.00 |
| Urban/Rural | 1.41 | 0.234 | |
| Rural | | | 1.00 |
| Urban | | | 1.14 |

*The referent group for each comparison is represented by 1.00.